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FISHES OF OKATOMA CREEK, A FREE-FLOWING STREAM IN SOUTH-CENTRAL MISSISSIPPI

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ABSTRACT

Okatoma Creek, a 71 km stream in the Pascagoula River Drainage of south-central Mississippi, supports a diverse native fish fauna. Based on collections made from 1937 to 1989, the known ichthyofauna of the main channel and the lower reaches of its tributaries includes 62 species, with a possible eight additional species reported from the literature. The fauna is dominated by cyprinids and darters which are represented by 16 and 13 species, respectively. The most frequently occurring species in the main channel, based on the percentage of total species lots, are *Cyprinella venusta, Fundulus olivaceus, Luxilus chrysocephalus, Lepomis megalotis, Notropis volucellus, Notropis buccatus, Etheostoma beani, Notropis longirostris, Lythrurus roseipinnis,* and *Percina sciera.*

INTRODUCTION

Okatoma Creek, a tributary of the Bowie River in the Pascagoula River Drainage, flows southeast through five counties in south-central Mississippi. In 1978 the Mississippi Heritage Conservation and Recreation Service declared Okatoma Creek to be a Class A stream suitable for inclusion under the Federal Wild and Scenic Rivers Act of 1968; however, the actual incorporation has not yet taken place.

The stream is largely unaltered throughout its length and is free from impoundments on the main channel. However, one plan (Soil Conservation Service, 1974) projects an impoundment on the upper reaches of the stream about 3.2 km north of state highway 28 east of Magee, Mississippi. This plan also includes desnagging between Seminary and Collins, Mississippi, and some channelization work (enlarging and shaping of the channel) near Magee. In addition, fourteen flood retarding devices would be built at various points throughout the drainage.

There is little published information on the fishes of the Okatoma Creek system. Early collectors in Mississippi (Hay, 1881; 1883; Evermann, 1899; Hildebrand and Towers, 1928; Hildebrand, 1933) did not sample Okatoma Creek, although Hay did collect in the Pascagoula River Drainage during his 1880 trip through Mississippi (Hay, 1881). Although Cook (1952) listed *Lampetra aepyptera* from a 'backwater' of Okatoma Creek in Simpson County, she later (Cook, 1959) included only tributaries of Okatoma Creek in her list of collecting sites of Mississippi fishes. The most comprehensive survey prior to our work on Okatoma Creek was by Teels (1975) who listed 55 species of fishes, which were obtained from 10 collections taken throughout the drainage in 1968 and 1975. Unfortunately most of this material was not archived and is unavailable for verification.

We initiated this study of Okatoma Creek because of the lack of published information on the fishes and the proposed, still pending environmental modifications to the creek. Our emphasis has been on the main channel, and on the lower sections of tributaries near the main channel. Herein we present data on the fishes of Okatoma Creek, and on longitudinal changes of species composition as related to physical characteristics of the watershed.

STUDY AREA

Okatoma Creek drains an area of 751.2 km^2 (U.S. Geological Survey, 1977) located in the Pine Hills physiographic region of the East Gulf Coastal Plain province (Cross et al., 1974). The watershed varies from 8 to 16 km in width and is about 106 km long (Rich, 1968). Okatoma Creek itself is approximately 71 km long, with numerous meanders among small rolling hills. The headwaters of Okatoma Creek are Dry Creek and Haw Branch, located in Simpson County north of Magee. Okatoma Creek ends at its confluence with Bowie Creek northwest of Hattiesburg. Average discharge (based on 25 measurements from 1980-1988) at the state highway 590 bridge near the town of Seminary was 6 m^3/s, with a minimum flow of 1.9 and a maximum of 45.6 m^3/s (USGS 1980-1988).

The stream bed near the headwaters cuts the sand and

gravel of the Plio-Pleistocene? Citronelle Formation. Southward from Collins, the eroded Miocene Catahoula sandstone forms waterfalls and hard, erosion-pocketed bottoms providing a sharp contrast to the stream bed of the upper reaches. The lower reaches are in the Miocene Hattiesburg-Pascagoula formations and have many sand and gravel riffles.

For purposes of data analysis we recognize three sections of the main channel, based on the three geologic formations through which it flows:

1) Citronelle Formation--This formation extends from the headwaters to just north of Seminary and contributes to the sand, gravel, and clay substrata of the stream bed in this area (Stations 1-13).

2) Catahoula Formation--The stream flows through the sandstone erosional features of this formation between Seminary and Sanford (Stations 14-22).

3) Hattiesburg-Pascagoula Formations--These formations extend from Sanford to the confluence of Okatoma Creek with the Bowie River and contribute to the gravel, sand, and clay substrata of this reach of the stream (Stations 23-34).

MATERIALS AND METHODS

This study is based on 95 collections, resulting in 997 species lots, made from 1937 to 1989 using a variety of small-mesh seines (Table 1). A collection represents fishes taken at a single site on an individual day. The majority of these collections were taken from October 1978 through October 1979 by DCH, JWB and students with a 3 m, 4.8 mm Ace mesh seine, and by STR and students from 1975 to 1989 using 6.1 m and 3.05 m, 3.1 mm Ace mesh seines. Specimens from these collections are stored in the University of Southern Mississippi Museum of Ichthyology. Other records were obtained from a computer database of Mississippi fish distributions built from an examination of specimens and museum records from over 30 fish collections in the eastern United States (Ross and Brenneman, 1991). Due to the potentially different methods and biases of the various collectors, data are treated qualitatively. Similarities between physiographic regions were determined by the Jaccard coefficient, which is based on presence/absence data (Ludwig and Reynolds, 1988).

Names of fishes follow Robins et al. (1991), with some exceptions. Based on studies by Simons (1991; in press), we place *Ammocrypta beani* and *A. vivax* in *Etheostoma*. In addition, we recognized the families Fundulidae, following Parenti (1981), and Elassomatidae, following Branson and Moore (1962) and Rohde and Arndt (1987).

COLLECTING LOCALITIES

Data are based on 35 general collecting stations along the main channel, and on 12 stations along the tributaries (Fig. 1). Collections were made by numerous investigators over a number of years; therefore, the area sampled per collection is variable. Data for most stations are composites of more than one collection. Collecting sites are identified generally by township, range and section (T, R, sec.), and to within approximately 200-400 m by universal transverse Mercator coordinates (North-South coordinates = utmy; East-West coordinates = utmx). Localities that were only given as township, range and section were arbitrarily placed midway along the channel for that section. Numbers after each collecting station description correspond to species as shown on Table 2.

Table 1. A chronology of fish collections in Okatoma Creek and its tributaries. Specimens are housed at the University of Southern Mississippi Museum of Ichthyology (USM) unless otherwise indicated. Museum acronyms follow Levinton et al. (1985) and Levinton and Gibbs (1988).

year	number of lots	museum
1937	1	MMNS
1947	1	MMNS
1949	7	CU
1962	17	MMNS
	1	SLU
1963	2	MMNS
1964	1	MMNS
	2	TU
1968	28	TU
1970	25	TU
1971	8	MMNS
1975	13	
1976	15	
1978	186	
	1	UM
1979	431	
1980	6	
1981	2	
1982	9	
1983	19	
1984	121	
1986	33	
1987	31	
1988	19	
1989	17	

Main Channel, Okatoma Creek

Station 1. [Haw Branch] at unnamed road 0.50-0.75 mile S state hwy. 540 about 1 mile SW Martinville (T2N, R5E, sec. 35)(utmx= 238900; utmy= 3539400). 12 species: 5, 9, 14, 16, 17, 35, 36, 39, 40, 41, 43, 47.

Station 2. [Haw Branch] at state hwy. 541 (T1N, R5E, sec. 2)(utmx= 240300; utmy= 3539000). 13 species: 4, 5, 9, 14, 17, 20, 33, 36, 40, 41, 43, 45, 47.

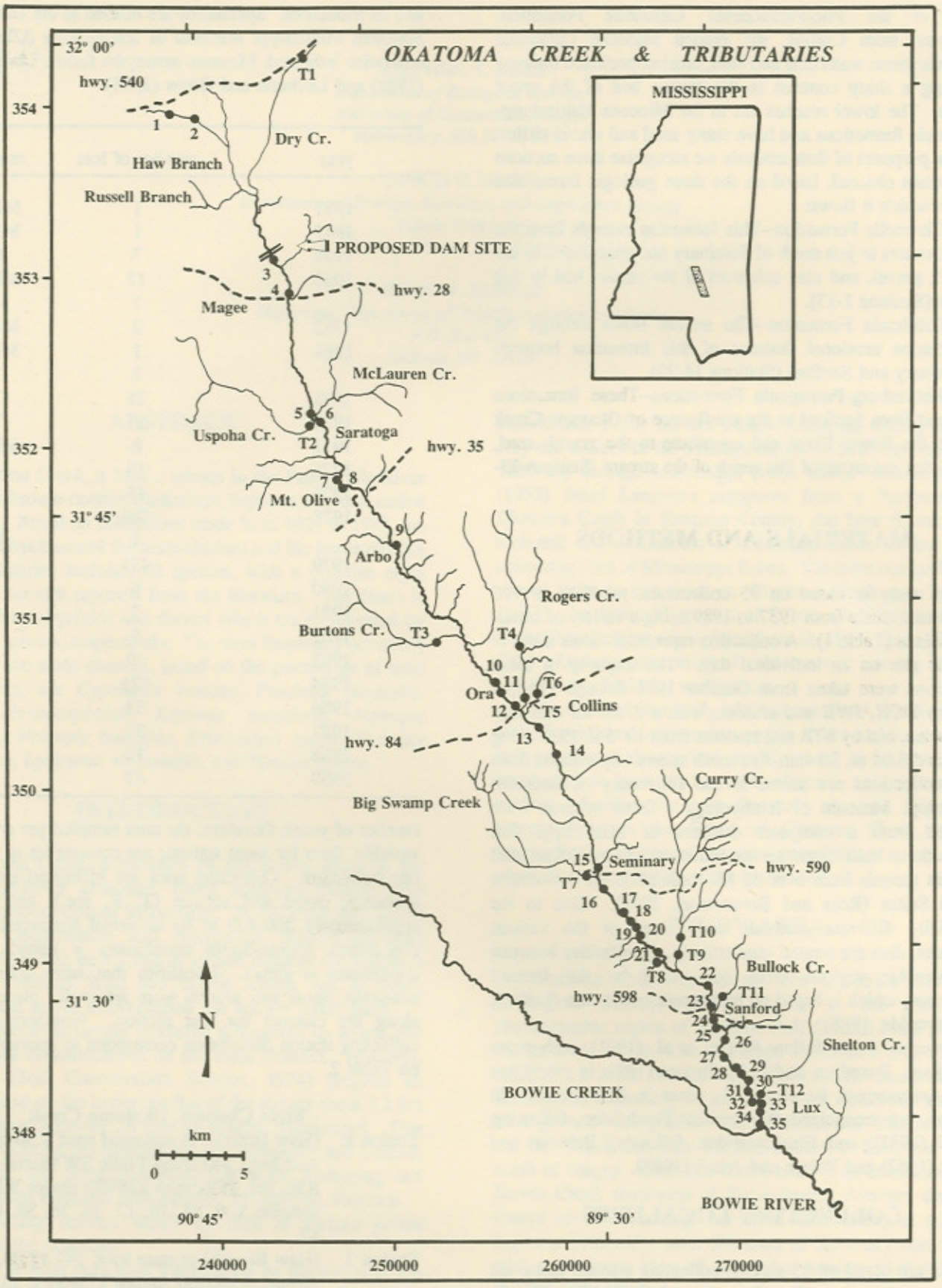

Figure 1. A map of the Okatoma Creek, Mississippi, watershed showing collecting stations. Mercator coordinates are indicated by the outward facing tick marks; latitude and longitude by the inner facing marks. Vertical Mercator coordinates are x 10,000.

Station 3. At unnamed road about 2 miles ENE of Magee (T1N, R6E, sec. 32)(utmx= 244700; utmy= 3530600). 21 species: 3, 4, 5, 8, 9, 12, 14, 15, 17, 31, 35, 36, 37, 39, 40, 41, 43, 45, 47, 56, 58.

Station 4. At state hwy. 28 bridge about 1.75 mile E of Magee (T10N, R6E, sec. 3)(utmx= 245400; utmy= 3528500). 22 species: 3, 4, 5, 14, 15, 16, 17, 27, 30, 35, 36, 37, 39, 40, 41, 43, 45, 47, 54, 56, 58, 59.

Station 5. At railroad bridge about 3/4mi. NNE of Saratoga; T10N, R17W, sec. 26)(utmx= 247000; utmy= 3521500). 16 species: 3, 4, 5, 11, 14, 15, 16, 27, 35, 43, 49, 51, 54, 56, 58, 59.

Station 6. Along E bank opposite mouth of Uspoha Creek (T10N, R17W, sec. 26) (utmx= 246800; utmy= 3521350). 13 species: 3, 4, 5, 15, 23, 32, 35, 36, 37, 43, 46, 56, 58.

Station 7. Vicinity of unnamed road about 0.5 mi N of Mount Olive (T9N, R17W, sec. 12)(utmx= 248200; utmy= 3517700). 12 species: 3, 4, 5, 12, 14, 15, 16, 35, 36, 43, 54, 56.

Station 8. At Mt. Olive (T9N, R17W, sec. 12)(utmx= 248300; utmy= 3517500). 1 species: 11.

Station 9. At unnamed road about 0.7 mile NE of Arbo (T9N, R16W, sec. 20)(utmx= 251400; utmy= 3513800). 32 species: 3, 4, 5, 11, 12, 13, 15, 16, 17, 21, 22, 26, 28, 30, 34, 35, 36, 37, 39, 41, 43, 44, 45, 46, 47, 50, 52, 54, 55, 56, 58, 59.

Station 10. At unnamed road 0.5-0.7 mi ENE of Ora (T8N, R16W, sec. 13)(utmx= 256700; utmy= 3505600). 20 species: 3, 4, 5, 8, 12, 13, 15, 16, 22, 26, 35, 36, 41, 43, 46, 50, 52, 55, 56, 58.

Station 11. 1 mi. N of Collins, just S of Ora (T8N, R16W, sec. 13)(utmx= 257000; utmy= 3505300). 12 species: 3, 13, 20, 22, 25, 30, 31, 35, 40, 43, 46, 50.

Station 12. At hwy. 84 bridge NE Collins (T8N, R15W, sec. 19)(utmx= 258000; utmy= 3503000). 28 species: 3, 4, 5, 12, 14, 15, 16, 17, 18, 22, 23, 27, 30, 32, 35, 36, 37, 38, 39, 41, 43, 45, 47, 49, 53, 55, 58, 59.

Station 13. 1 mi. S of Collins (T8N, R15W, sec. 19)(utmx= 259400; utmy= 3503000). 1 species: 4.

Station 14. At unnamed road 0.25 mi W of Kola (T8N, R15W, sec. 29)(utmx= 260300: utmy= 3501500). 16 species: 3, 5, 12, 13, 15, 21, 26, 35, 41, 43, 46, 50, 52, 55, 56, 59.

Station 15. Vicinity of state hwy. 590, W of Seminary (T7N, R15W,sec. 21) (utmx= 262400; utmy= 3494400). 13 species: 3, 4, 5, 15, 18, 21, 35, 43, 50, 52, 54, 56, 59.

Station 16. About 0.5mi. below state hwy.590, 0.4 air-miles SSW of Seminary (T7N, R15W, sec.22)(utmx= 262600; utmy= 3493400). 4 species: 1, 8, 35, 52.

Station 17. About 1.7 air-miles SSE of Seminary (T7N, R15W, sec. 27)(utmx= 263800; utmy= 3491800). 9 species: 3, 4, 27, 35, 36, 37, 39, 43, 52.

Station 18. About 2.0 air mi. SSE of Seminary (T7N, R15W, sec. 26)(utmx= 264400; utmy= 3491600). 22 species: 3, 4, 5, 7, 12, 13, 14, 15, 16, 18, 23, 26, 35, 36, 41, 43, 46, 50, 52, 54, 56, 59.

Station 19. About 2.6-2.8 air-miles SSE of Seminary; (T7N, R15W, sec. 35)(utmx= 264600 utmy= 3491000). 14 species: 3, 4, 5, 11, 12, 15, 26, 28, 35, 38, 46, 52, 58, 59.

Station 20. Above confluence of Neely Branch (T7N, R15W, sec. 35)(utmx= 264900; utmy= 3490800). 1 species: 7.

Station 21. N of Sanford at Fairchilds landing (T6N, R15W, sec. 1)(utmx= 265800; utmy= 3489600). 22 species: 3, 4, 5, 8, 11, 12, 13, 14, 15, 16, 18, 23, 28, 35, 36, 43, 50, 52, 54, 56, 58, 59.

Station 22. About 0.75 air-mile NE of Sanford (T6N, R14W, sec. 7). (utmx= 268750; utmy= 3487500). 13 species: 3, 11, 12, 13, 15, 16, 18, 39, 43, 46, 47, 50, 59.

Station 23. At state hwy. 598 about 0.8 km WNW of Sanford (T6N, R14W, secs. 17 and 18)(utmx= 268900; utmy= 3486300). 29 species: 3, 4, 5, 7, 8, 11, 12, 13, 14, 15, 16, 18, 25, 27, 28, 35, 36, 38, 39, 41, 43, 44, 45, 46, 49, 50, 56, 58, 59.

Station 24. About .54 km below hwy. 598 bridge, S of Sanford (T6N, R14W, sec. 20)(utmx= 269000; utmy= 3485800). 3 species: 52, 58, 59.

Station 25. 0.8-1.0 km below hwy. 598 bridge, S of Sanford (T6N, R14W, sec. 17)(utmx= 269100; utmy= 3485500). 17 species: 3, 4, 5, 11, 12, 13, 15, 16, 21, 35, 43, 46, 50, 52, 54, 58, 59.

Station 26. About 1.2 air-miles S of Sanford (T6N, R14W, sec. 20)(utmx= 269700 ; utmy= 3484500). 32 species: 3, 4, 5, 6, 7, 8, 11, 12, 13, 14, 15, 16, 18, 21, 23, 26, 35, 36, 38, 39, 43, 46, 48, 50, 52, 54, 55, 56, 58, 59, 60, 62.

Station 27. 2.1 km downstream from hwy. 598 bridge (T6N, R14W, sec. 20)(utmx= 269500; utmy= 3484000). 12 species: 3, 5, 7, 12, 13, 15, 18, 43, 50, 52, 56, 58.

Station 28. About 2.2 air miles SSE of Sanford, 1.4 miles NW Lux (T6N, R14W, sec. 29)(utmx= 270400; utmy= 3482900). 18 species: 3, 4, 8, 12, 13, 15, 16, 18, 21, 35, 41, 43, 46, 47, 50, 54, 58, 59.

Station 29. About 1 mile upstream from bridge near Lux (T6N, R14W, sec. 28)(utmx= 270800; utmy= 3482500). 24 species: 3, 4, 6, 7, 11, 12, 13, 14, 15, 16, 17, 18, 21, 23, 35, 37, 41, 43, 46, 47, 50, 52, 59, 61.

Station 30. 4.4 km downstream from hwy. 598 bridge; 1.4 km upstream from bridge near Lux (T6N, R14W, sec. 28) (utmx= 270800; utmy= 3482300). 13 species: 3, 4, 5, 7, 8, 12, 13, 15, 21, 35, 39, 50, 54.

Station 31. 5.3 km downstream from hwy. 598 bridge; 0.7 km upstream from bridge near Lux (T6N, R14W, Sec. 33)(utmx= 271000; utmy= 3481500). 16 species:

3, 4, 5, 7, 8, 12, 13, 15, 16, 35, 43, 46, 47, 50, 52, 54.

Station 32. Vicinity of bridge crossing near Lux (T6N, R14W, sec. 33)(utmx= 271500; utmy= 3481000). 28 species: 3, 4, 5, 7, 8, 10, 11, 12, 13, 15, 16, 18, 21, 28, 29, 35, 36, 38, 39, 41, 43, 46, 47, 50, 52, 54, 58, 59.

Station 33. About 1 stream mile above unnamed road WSW Lux (T6N, R14W, sec. 33)(utmx= 271600; utmy= 3480800). 16 species: 3, 4, 8, 12, 13, 15, 18, 35, 38, 39, 50, 52, 54, 55, 58, 59.

Station 34. Vicinity of unnamed road about .5 mile WSW Lux (T6N, R14W, sec. 33)(utmx= 271600; utmy= 3480600). 18 species: 3, 7, 8, 12, 13, 15, 16, 17, 18, 19, 21, 26, 35, 36, 41, 43, 46, 50.

Station 35. At confluence with Bowie River (T5N, R14W, sec. 4)(utmx= 271500; utmy= 3479500). 2 species: 16, 39.

Tributaries

Station T1. Unnamed tributary to Dry Creek, 5 mi. ENE of Martinville at state hwy. 540 (T2N, R6E, sec. 21)(utmx= 266600; utmy= 3542600). 11 species: 9, 17, 24, 32, 35, 36, 39, 40, 41, 43, 47.

Station T2. Uspoha Creek, between mouth of creek and railroad crossing, 3/8mi NNE of Saratoga (T10N, R6E, sec. 26) (utmx= 246550; utmy = 3521200). 24 species: 1, 3, 4, 5, 8, 11, 12, 14, 15, 16, 20, 21, 23, 27, 28, 31, 35, 38, 43, 50, 52, 55, 56, 58.

Station T3. Burtons Creek, 3 miles N of Collins at state hwy. 49 (T8N, R16W, sec. 3)(utmx= 253500; utmy= 3508200). 5 species: 2, 21, 22, 23, 46.

Station T4. Rogers Creek, 2.9 miles N of Collins (T8N, R15W, sec. 7)(utmx= 258400; utmy= 3507800). 6 species: 1, 4, 5, 11, 35, 55.

Station T5. Rogers Creek, near Collins (T8N, R15W, sec. 18)(utmx= 258300; utmy= 3504500). 1 species: 14.

Station T6. Unnamed tributary to Okatoma Creek, 1.7 miles E of Collins (T8N, R15W, sec. 18)(utmx= 259500; utmy= 3505000). 7 species: 4, 8, 11, 35, 43, 53, 55.

Station T7. Big Swamp Creek, locality estimated at state hwy. 49 (T7N, R15W, sec. 21)(utmx= 261300; utmy= 3494700). 1 species: 50.

Station T8. Unnamed tributary to Okatoma Creek near Station 20 (T6N, R15W, sec. 1)(utmx= 265700; utmy= 3489500). 3 species: 8, 11, 52.

Station T9. Curry Creek, vicinity of railroad bridge north of Sanford (T6N, R15W, sec. 1)(utmx= 267000; utmy= 3489500). 27 species: 3, 4, 5, 7, 8, 11, 12, 13, 16, 18, 20, 21, 28, 29, 35, 36, 38, 39, 42, 46, 50, 52, 53, 54, 55, 57, 58.

Station T10. Curry Creek, off dirt road ca. 3.5 miles N Sanford (T7N, R15W, sec. 36)(utmx= 267300; utmy= 3490500). 21 species: 3, 4, 5, 8, 11, 12, 13, 16, 28, 35, 36, 39, 41, 43, 46, 47, 50, 54, 55, 56, 58.

Station T11. Bullock Creek, at railroad bridge ca. 1 mile NNE of Sanford (T6N, R14W, sec. 8)(utmx= 269400; utmy= 3487000). 7 species: 8, 11, 12, 21, 28, 35, 52.

Station T12. Shelton Creek, at mouth (T6N, R14W, sec. 33)(utmx= 271400; utmy= 3481200). 7 species: 3, 13, 39, 40, 41, 43, 44.

RESULTS AND DISCUSSION

Sixty-two species of fishes were collected from Okatoma Creek and its tributaries; 58 were taken from the main channel and 45 from the tributaries (Table 2). Teels (1975) previously reported 55 species from 10 localities in Okatoma Creek and its tributaries. We did not collect 12 of the species reported by Teels (1975), including *Dorosoma cepedianum, Alosa chrysochloris, Pimephales notatus, Hybognathus nuchalis, Ictiobus bubalus, Moxostoma erythrurum, Pylodictus olivaris, Noturus funebris, Etheostoma proeliare, Etheostoma nigrum, Etheostoma whipplei,* and *Mugil cephalus.* Five of these species (*D. cepedianum, A. chrysochloris, H. nuchalis, P. olivaris,* and *M. cephalus*) have been collected downstream of Okatoma Creek in the Leaf River (Ross et al., 1990). In addition, *I. bubalus* is documented from the Bowie River (just downstream of Okatoma Creek), and *N. funebris* and *E. proeliare* are reported from the Leaf River (Ross and Brenneman, 1991). Consequently, these eight species likely are valid records for Okatoma Creek.

Reports for the other four species (Teels, 1975) are not supported by more recent information and are of doubtful validity. *Etheostoma whipplei* has been reported previously from the Pascagoula River Drainage in the headwaters of the Chickasawhay River and from the Leaf River (Retzer et al., 1986). Based on examination of museum material, Ross and Brenneman (1991) list four occurrences in the upper Chickasawhay River. Extensive recent field work in the mid- to lower-reaches of the Leaf River has not yielded *E. whipplei* (Ross et al., 1989; 1990). Thus, we believe that *E. whipplei* is an unlikely inhabitant of Okatoma Creek and that fish identified by Teels (1975) as *E. whipplei* were probably *E. swaini*, a species which has been collected in Okatoma Creek. Three other unconfirmed species reported by Teels (1975), *P. notatus, M. erythrurum* and *E. nigrum*, are not documented by museum specimens from the Pascagoula River Drainage (Ross and Brenneman, 1991) and their presence in Okatoma Creek is unlikely. Thus, based on comparison of our data with Teels (1975), the fish fauna of Okatoma Creek and its tributaries may include at least 70 species.

Overall, the fauna (Table 2) is dominated by cyprinids (16 species), darters (13 species) and centrarchids (11 species). Within the main channel, the ten most frequently occurring species (based on the percentage of total lots) are *Cyprinella venusta* (7.1%), *Fundulus olivaceus* (5.6%), *Luxilus chrysocephalus* (5.5%), *Lepomis megalotis* (5.0%), *Notropis*

Table 2. Fishes of the Okatoma Creek watershed. The numbers under the position heading correspond to: 1- Citronelle Formation; 2- Catahoula Formation; 3- Pascagoula-Hattiesburg Formation.

Family and Species		Main Channel[1] Position	Main Channel[1] Lots N (%)	Tributaries Lots N (%)	Total Lots N (%)
Petromyzontidae					
1	*Ichthyomyzon gagei*	2	1 (.12)	2 (1.23)	3 (.30)
Anguillidae					
2	*Anguilla rostrata*	-	--	1 (.61)	1 (.10)
Cyprinidae					
3	*Cyprinella venusta*	1,2,3	59 (7.07)	5 (3.07)	64 (6.42)
4	*Luxilus chrysocephalus*	1,2,3	46 (5.52)	12 (7.36)	58 (5.82)
5	*Lythrurus roseipinnis*	1,2,3	34 (4.08)	8 (4.91)	42 (4.21)
6	*Macrhybopsis aestivalis*	3	3 (.36)	--	3 (.30)
7	*Macrhybopsis storeriana*	2,3	13 (1.56)	1 (.61)	14 (1.40)
8	*Nocomis leptocephalus*	1,2,3	19 (2.28)	9 (5.52)	28 (2.81)
9	*Notemigonus crysoleucas*	1	3(.36)	1 (.61)	4 (.40)
10	*Notropis atherinoides*	3	1 (.12)	--	1 (.10)
11	*Notropis baileyi*	1,2,3	15 (1.80)	12 (7.36)	27 (2.71)
12	*Notropis buccatus*	1,2,3	38 (4.58)	5 (3.07)	43 (4.31)
13	*Notropis longirostris*	1,2,3	35 (4.20)	5 (3.07)	40 (4.01)
14	*Notropis texanus*	1,2,3	13 (1.56)	3 (1.84)	16 (1.60)
15	*Notropis volucellus*	1,2,3	39 (4.68)	3 (1.84)	42 (4.21)
16	*Notropis winchelli*	1,2,3	25 (3.00)	3 (1.84)	28 (2.81)
17	*Opsopoeodus emiliae*	1,3	10 (1.20)	1 (.61)	11 (1.10)
18	*Pimephales vigilax*	1,2,3	20 (2.40)	1 (.61)	21 (2.11)
Catostomidae					
19	*Carpiodes cyprinus*	3	1 (.12)	--	1 (.10)
20	*Erimyzon tenuis*	1	3 (.36)	2 (1.23)	5 (.50)
21	*Hypentelium nigricans*	1,2,3	16 (1.92)	4 (2.45)	20 (2.01)
22	*Minytrema melanops*	1	8 (.96)	1 (.61)	9 (.90)
23	*Moxostoma poecilurum*	1,2,3	6 (.72)	2 (1.23)	8 (.80)
Ictaluridae					
24	*Ameiurus melas*	-	--	1 (.61)	1 (.10)
25	*Ameiurus natalis*	1,2	2 (.24)	--	2 (.20)
26	*Ictalurus punctatus*	1,2,3	7 (.84)	--	7 (.70)
27	*Noturus gyrinus*	1,2	5 (.60)	1 (.61)	6 (.60)
28	*Noturus leptacanthus*	1,2,3	7 (.84)	7 (4.29)	14 (1.40)
29	*Noturus nocturnus*	3	1 (.12)	1 (.61)	2 (.20)
Esocidae					
30	*Esox americanus*	1	4 (.48)	--	4 (.40)
31	*Esox niger*	1	2 (.24)	1 (.61)	3 (.30)
Aphredoderidae					
32	*Aphredoderus sayanus*	1	2 (.24)	1 (.61)	3 (.30)
Fundulidae					
33	*Fundulus notatus*	1	1 (.12)	--	1 (.10)
34	*Fundulus notti*	1	1 (.12)	--	1 (.10)
35	*Fundulus olivaceus*	1,2,3	47 (5.64)	9 (5.52)	56 (5.62)
Poeciliidae					
36	*Gambusia affinis*	1,2,3	26 (3.12)	4 (2.45)	30 (3.01)
Atherinidae					
37	*Labidesthes sicculus*	1,2,3	7 (.84)	--	7 (.70)
Centrarchidae					
38	*Ambloplites ariommus*	1,2,3	8 (.96)	2 (1.23)	10 (1.00)
39	*Lepomis cyanellus*	1,2,3	17 (2.04)	4 (2.45)	21 (2.11)
40	*Lepomis gulosus*	1	5 (.60)	2 (1.23)	7 (.70)
41	*Lepomis macrochirus*	1,2,3	18 (2.16)	3(1.84)	21 (2.11)
42	*Lepomis marginatus*	-	--	1 (.61)	1 (.10)
43	*Lepomis megalotis*	1,2,3	42 (5.04)	5 (3.07)	47 (4.71)

Table 2. Continued.

	Family and Species	Main Channel[1] Position	Main Channel[1] Lots N (%)	Tributaries Lots N (%)	Total Lots N (%)
44	*Lepomis microlophus*	1,2	2 (.24)	1 (.61)	3 (.30)
45	*Lepomis punctatus*	1,2	6 (.72)	--	6 (.60)
46	*Micropterus punctulatus*	1,2,3	31 (3.72)	4 (2.45)	35 (3.51)
47	*Micropterus salmoides*	1,2,3	12 (1.44)	2 (1.23)	14 (1.40)
48	*Pomoxis annularis*	3	1 (.12)	--	1 (.10)
Elassomatidae					
49	*Elassoma zonatum*	1,2	3 (.36)	--	3 (.30)
Percidae					
50	*Etheostoma beani*	1,2,3	38 (4.56)	6 (3.68)	44 (4.41)
51	*Etheostoma histrio*	1	1 (.12)	--	1 (.10)
52	*Etheostoma lynceum*	1,2,3	25 (3.00)	6 (3.68)	31 (3.11)
53	*Etheostoma parvipinne*	1	1 (.12)	2 (1.23)	3 (.30)
54	*Etheostoma stigmaeum*	1,2,3	20 (2.40)	3 (1.84)	23 (2.31)
55	*Etheostoma swaini*	1,3	8 (.96)	6 (3.68)	14 (1.40)
56	*Etheostoma vivax*	1,2,3	14 (1.68)	3 (1.84)	17 (1.71)
57	*Percina lenticula*		--	1 (.61)	1 (.10)
58	*Percina nigrofasciata*	1,2,3	26 (3.12)	6 (3.68)	32 (3.21)
59	*Percina sciera*	1,2,3	33 (3.96)	--	33 (3.31)
60	*Percina vigil*	3	1 (.12)	--	1 (.10)
61	*Percina* sp., gulf logperch	3	1 (.12)	--	1 (.10)
62	*Percina* sp., Pearl River channel darter	3	1 (.12)	--	1 (.10)
totals			834	163	997

[1] main channel includes sites in Haw Creek

volucellus (4.7%), *Notropis buccatus* (4.6%), *Etheostoma beani* (4.6%), *Notropis longirostris* (4.2%), *Lythrurus roseipinnis* (4.1%), and *Percina sciera* (4.0%).

The three regions of the main channel are similar in species composition, with the highest similarities between adjoining regions ($J_{1,2}$= .70; $J_{1,3}$= .56; $J_{2,3}$= .66). The fauna of the Catahoula formation is slightly more similar to that of the upstream Citronelle, than to the downstream Hattiesburg-Pascagoula formation.

Eleven species were taken at one to four stations (usually in low numbers) only within the Citronelle Formation. *Notemigonus crysoleucas, Erimyzon tenuis, Minytrema melanops, Esox americanus, E. niger, Aphredoderus sayanus, Fundulus notatus, F. notti, Lepomis gulosus, Etheostoma histrio,* and *E. parvipinne* comprised this group. Although *Ichthyomyzon gagei* was found in the main channel only within the reaches of the Catahoula Formation, it was taken from tributaries flowing over the Citronelle formation. Eight species, *Macrhybopsis aestivalis, Notropis atherinoides, Carpiodes cyprinus, Noturus nocturnus, Pomoxis annularis, Percina* sp., cf. *copelandi, P.* sp., cf. *caprodes,* and *Percina vigil,* were each taken only at one or two stations in the Pascagoula and Hattiesburg formations; they generally were caught in small numbers. Most other species were collected from two to three of the major physiographic subdivisions of the stream.

Among the more common species taken from three physiographic subdivisions, *Notropis buccatus* was more abundant in the lower reaches of Okatoma Creek. Other species which were more common in the lower sections were *Notropis longirostris* and *Cyprinella venusta.* Although *Etheostoma beani* and *Etheostoma vivax* were collected throughout much of the stream, *E. vivax* was more common in the admixed sand and gravel areas of the Citronelle and Catahoula formations, while *E. beani* was more common in the sandy substrata of the Hattiesburg-Pascagoula formations and the lower portion of the Citronelle Formation.

The Okatoma Creek system has a relatively diverse ichthyofauna. Of the 86 total species reported for the Pascagoula River Drainage (Swift et al., 1986), at least 67% inhabit reaches of the Okatoma Creek and its tributaries. Okatoma Creek supports a greater diversity of fishes than many other stream systems of comparable drainage area flowing into the northern Gulf of Mexico, except for the streams in the Tombigbee River Drainage (Table 3). Bayou Sara, which flows into the Mississippi River also has a somewhat larger fauna. The diverse fish assemblage of Okatoma Creek is due at least in part to the habitat diversity resulting from the varied physiographic features of the stream.

Alterations to the stream, such as channelization and desnagging, which reduce this habitat diversity or change the physical conditions of the remaining habitats may be expected to result in a reduction of the size and diversity of the species assemblage of fishes. Moreover, many of the channel modifications were proposed for the upper section of Okatoma Creek, which flows over the Citronelle Formation and supports

Table 3. Fish species diversity (freshwater and anadromous forms) for stream systems of the southeastern coastal plain of Mississippi, Alabama , and Louisiana, arranged by drainage area. Terminology for basin and drainages follows Ross and Brenneman (1991), as modified from Jenkins et al. 1971.

Stream	Basin	Drainage	Drainage Area (km^2)	Species	Reference
Bull Mountain Creek	Gulf of Mexico	Tombigbee River	347	79	Pierson and Schultz (1984)
Bayou Sara	Mississippi River	Lower Miss. River S	493	80	Grady et al. (1983)
Okatoma Creek	Gulf of Mexico	Pascagoula River	751	62 (+8)	present study
Sucarnoochee River	Gulf of Mexico	Tombigbee River	1567	101	Hubbard et al. (1991)
Biloxi Bay system	Gulf of Mexico	Coastal Rivers	1760	39	Caldwell (1966)
Bay St. Louis system	Gulf of Mexico	Coastal Rivers	2046	43	Caldwell (1966)
Escatawpa River	Gulf of Mexico	Pascagoula River	2650	51	Beckham (1977)
Noxubee River	Gulf of Mexico	Tombigbee River	2953	93	Hubbard (1987)

a rich and somewhat different fish fauna than the lower sections. Thus, potential losses to biodiversity may be particularly great if the proposed stream alterations are completed.

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Note added in proof:

Based on a recent re-examination of mosquitofish by STR, it is apparent that both *Gambusia affinis* and *G. holbrooki*, as well as intergrades between the two forms, occur in the Pascagoula River Drainage including Okatoma Creek. In Okatoma Creek there is apparently not a longitudinal pattern to their distribution; frequencies of each form are: *G. affinis* - 41%; *G. holbrooki* - 31%, and intergrades - 28% (N=75).